



**U.S. Army Research Institute
for the Behavioral and Social Sciences**

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**Summary of Recommendations for Successful
Fielding of Force XXI Training Products**

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Human Resources Research Organization

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**U.S. Army Research Institute
for the Behavioral and Social Sciences**

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FOREWORD

As the U.S. Army grapples with the challenge of meeting complex training requirements with increasingly constrained resources, Army trainers are exploring emerging technologies and innovative techniques that can be used to achieve training goals. Part of this exploration has been accomplished through the Force XXI Training Program (FXXITP). Established in 1995 by the U.S. Army Training and Doctrine Command (TRADOC), the FXXITP is overseen by the Directorate of Training and Doctrine Development (DTDD) of the U.S. Army Armor Center (USAARMC) at Fort Knox, Kentucky. With the active participation of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI), DTDD has sponsored the development of numerous training products for the program. The majority of the work was performed at the ARI Armored Forces Research Unit at Fort Knox, with additional work completed at the Infantry Forces Research Unit at Fort Benning, Georgia. The work centered on the development of simulation-based, structured training support packages (TSPs) designed for the collective training of reserve component (RC) and active component (AC) battalion and brigade staffs.

As the initial FXXITP products began to receive attention from potential users, the TRADOC Deputy Chief of Staff for Training (DCST) directed that these products be assessed while being used by AC brigades. The assessment was to focus on the utility of the TSPs in supporting the brigades' yearly training, specifically in preparation for National Training Center rotations. The DCST asked ARI to provide the support for assessment, and this was accomplished by means of a project entitled *Implementation and Support for the Assessment of Force XXI Training Program (ISAT)*. The ARI conducted the assessment with the assistance of four AC brigades between April 1998 and May 1999.

While the primary focus of the DCST directive was on assessment of FXXITP product utility, ARI also supported the implementation of the products, to ensure that the assessment would take place in a context of full product use. Therefore, the assessment strategy included plans for a support infrastructure that would facilitate integration of the FXXITP products into unit training plans.

The scope of the assessment, as originally planned, was adjusted continually over the course of the project due to external constraints and other demands on the activities of the participating units. As a result, the assessment questions could not be completely addressed. This report presents a succinct summary of the conditions of the implementation and the assessment lessons learned and recommendations. A larger report, *Operational Assessment of Force XXI Training Products: Lessons for Successful Fielding* (Pratt et al., 2000) discusses the background of the ISAT project and documents project activities and outcomes in more detail. The implementation and support history, assessment results, and lessons learned were briefed to the office of the DCST on 21 July 1999. The findings summarized in this report should support the development and fielding of TSPs that will improve the near-term readiness of the Army's AC and RC forces.

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Technical Director

SUMMARY OF RECOMMENDATIONS FOR SUCCESSFUL FIELDING OF FORCE XXI TRAINING PRODUCTS

EXECUTIVE SUMMARY

Research Requirement:

The U.S. Army is facing the challenge of meeting complex training requirements with increasingly constrained resources. As a result, Army trainers are exploring emerging technologies and innovative techniques that can be used to achieve training goals. Much of the innovation has been accomplished through the Force XXI Training Program (FXXITP).

The FXXITP was established in 1995 by the U.S. Army Training and Doctrine Command (TRADOC) and is overseen by the Directorate of Training and Doctrine Development (DTDD) of the U.S. Army Armor Center (USAARMC) at Fort Knox, Kentucky. The DTDD has worked with the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) to research and develop numerous training products for the program. In 1998, the TRADOC Deputy Chief of Staff for Training (DCST) directed that these products be assessed while being used by active component brigades. While the primary focus of the DCST directive was on assessment of FXXITP product utility, ARI directed that the contractor team also support implementation of the products, to ensure that the assessment would take place in a context of full product use. Therefore, the assessment strategy included plans for a support infrastructure that would facilitate integration of the FXXITP products into unit training plans.

The project that was organized to support the DCST directive was titled *Implementation and Support for the Assessment of Force XXI Training Program (ISAT)*. The specific objectives included: (a) to develop a plan to guide the implementation and assessment of selected components of the FXXITP; (b) to build an implementation support infrastructure at participating unit locations to facilitate the assessment; (c) to conduct the implementation and assessment at unit locations and Fort Irwin, California, (the National Training Center [NTC]); and (d) to document the implementation and assessment process, the results of the assessment, required changes to the products, and suggestions for future development.

Procedure:

The project's Execution Plan (Human Resources Research Organization [HumRRO], Raytheon Systems Company, TRW S&ITG, & Litton PRC, 1998b) outlined the project's strategy for accomplishing the objectives. It included plans for managing the project from Fort Knox, and providing support to the two selected user units. Data collection for the assessment would involve interviews, questionnaires, and observations, as outlined in the Assessment Plan (HumRRO et al., 1998a).

The activities supporting the implementation included purchase and installation of training computers and associated components; reproduction and distribution of computer-based training programs for individual staff members and training support packages (TSPs) for small group and complex group exercises; hiring and training of on-site personnel at the user unit sites who would provide train-the-trainer sessions on all FXXITP products and assist with implementation of the individual computer-based instruction and small group exercises; and a

system whereby personnel from Fort Benning, and Fort Knox could be available to answer difficult questions about the FXXITP products and could travel to the user units and assist with implementation of the complex group exercises.

The assessment requirement (HumRRO et al., 1998a) included observation and documentation of the implementation and assessment processes; data collection from participants by means of interviews and questionnaires; quantitative and qualitative analyses of the assessment data; and reporting of findings, lessons learned, and implications for FXXITP future directions.

Because only a limited number of brigades were going to participate in the implementation and assessment, and because there was no opportunity for rigorous control of the brigade activities, the assessment was not meant to be a full evaluation of the products' value or impact. Instead, ARI and DTDD asked for a complete case study of the implementation activities, along with intense efforts to obtain reactions and suggestions from all those involved in the product use.

Findings:

The ISAT project outcomes represent a compilation of implementation methods, assessment data and analyses, lessons, and recommendations, summarized in this report. The lessons address considerations of acceptability, impact, supportability, and training effectiveness assessment itself. Within the lessons, the research proffers solutions to the identified problems. Some of the solutions require additional research, while others will require action at the highest levels of Army leadership. Those solutions that are within the reach of training designers and developers include research on TSP and implementation models, redesign of TSP products and distribution requirements, and planning for maintenance and sustainment of products. Other solutions, including the need for command emphasis at division-level and higher, and the institutionalizing of the products, will require that TRADOC and Army leaders make a commitment to support the development and implementation of such products that may increase readiness without increasing training costs.

Project lessons also indicate the importance of maintaining the currency of training products, and of providing both education and implementation support to units who will use the products. Additionally, the data and comments from users highlight the importance of creating flexible training products that can be tailored to the needs of the user.

Utilization of Findings:

The ISAT project has generated information and lessons that will facilitate the fielding of structured training products. As a continuing emphasis is placed on providing low-resource, cost-effective training for U.S. Army personnel, this report can lead those training development efforts into the selection of appropriate design and implementation initiatives.

SUMMARY OF RECOMMENDATIONS FOR SUCCESSFUL FIELDING OF FORCE XXI TRAINING PRODUCTS

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Introduction

The U.S. Army is facing the challenge of meeting complex training requirements with increasingly constrained resources. As a result, Army trainers are exploring emerging technologies and innovative techniques that can be used to achieve training goals. Part of this exploration has been accomplished through the Force XXI Training Program (FXXITP).

The FXXITP was established in 1995 by the U.S. Army Training and Doctrine Command (TRADOC) and is overseen by the Directorate of Training and Doctrine Development (DTDD) of the U.S. Army Armor Center (USAARMC) at Fort Knox, Kentucky. The DTDD has worked with the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) to research and develop numerous training products for the program. The majority of the work was performed at the Armored Forces Research Unit (AFRU) at Fort Knox, with additional work completed at the Infantry Forces Research Unit (IFRU) at Fort Benning, Georgia. The work centered on the development of simulation-based, structured training support packages (TSPs) designed for the collective training of reserve component (RC) and active component (AC) battalion and brigade staffs.

Before the FXXITP products were accepted for fielding, the TRADOC Deputy Chief of Staff for Training (DCST) directed that they be assessed while being used by AC brigades. The assessment was to focus on the utility of the TSPs in supporting the brigades' yearly training, specifically in preparation for National Training Center (NTC) rotations. The ARI was to provide the support for assessment by means of a project entitled *Implementation and Support for the Assessment of Force XXI Training Program (ISAT)*. With a team of contractor personnel, ARI conducted the assessment with the assistance of four AC brigades between April 1998 and May 1999.

While the primary focus of the DCST directive was on assessment of FXXITP product utility, ARI directed that the contractor team also support implementation of the products, to ensure that the assessment would take place in a context of full product use. Therefore, the assessment strategy included plans for a support infrastructure that would facilitate integration of the FXXITP products into unit training plans.

Report organization

This research report describes briefly the ISAT project's assessment of the FXXITP products. The bulk of the report is devoted to summarizing the implications of the assessment findings and recommendations. A companion report, titled *Operational Assessment of Force XXI Training Products: Lessons for Successful Fielding* (Pratt, et al., 2000) contains details of the implementation and assessment, as well as more complete presentation of data analyses.

Background	Four of the FXXITP training products were selected to be the focus of the ISAT implementation and assessment:
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- Battle Staff Training System (BSTS),
- Brigade Staff Vignettes¹,
- Brigade Staff Exercises (BSE), and
- Brigade and Battalion Staff Exercises (BBSEs).

Research and development on the BSTS originated at ARI's Infantry Forces Research Unit (André, Wampler, & Olney, 1997). Research and development that led to production of the brigade staff vignettes, BSE, and BBSE was conducted by ARI AFRU. The vignettes and the BSE were completed in 1996 (C. H. Campbell, Graves, Deter, & Quinkert, 1998), and the BBSE was completed in 1998 (C. H. Campbell et al., 1999).

Battle Staff Training System

The BSTS consists of functional area TSPs for individual battalion- and brigade-level staff officers. The TSPs combine computer-based instruction (CBI) and text. Each TSP presents a course of instruction by means of CD-ROM based products and supplemental text-based instruction. Additionally, a training management system (TMS), Environment for MultiMedia interactive instruction (EMMii), allows the trainer or other designated individual in the unit to monitor the progress of individual staff officers as they proceed through the courses. Courses train commanders and staff officers in their individual warfighting skills to enhance their proficiency in synchronization of battlefield operating systems.

The Brigade Staff Vignettes

The brigade staff vignettes are 24 short, self-contained training activities that focus on specific staff process events. Each vignette is designed to provide practice and feedback on explicit objectives and tasks. The TSP for a vignette defines the objectives, outcomes, and limits of the training experience. The structure also includes the tactical scenario that provides the framework for the required activities. Four of the vignettes use constructive simulation (Brigade/Battalion Battle Simulation [BBS] or Janus) to generate scenario events, while the rest use only live simulation and thus can be conducted in a classroom or office. For example, the vignette, "Conduct Mission Transition – Offense to Defense" uses Janus to generate and feed the notional battle conditions to the staff in their command post (CP). The vignette, "Plan Reconnaissance and Surveillance," on the other hand, is driven by predetermined conditions and has no need for a dynamically changing situation.

¹ The vignettes were later renamed Small Group Exercises (SGEs) by DTDD.

The Brigade Staff Exercise

The BSE components include integrated scenarios covering the preparation, planning, execution, and consolidation and reorganization phases of the battle. The BSE scenarios are developed for constructive simulation (BBS) and are conducted in the notional Mojave Desert, including the NTC terrain “box.” The TSP for the exercise also contains brigade staff preparation materials and guidance, simulation system electronic files and documentation, instructions for interactors and roleplayers, materials and guidance to support observation and feedback, and complete details for exercise conduct and control.

The BSE focuses on the performance of the brigade commander and selected staff members. There are several key emphases, including the process of staff planning and decision-making; the integration of all brigade assets within the combat, combat support (CS), and combat service support (CSS) arenas; and the interactions among the primary staff members during planning, preparation, execution, and consolidation and reorganization.

The Brigade and Battalion Staff Exercise

The BBSE is a structured, multiechelon, battlestaff training exercise that encompasses planning, preparation, execution, and sustainment. It allows battalion and brigade commanders and staffs to interact as they plan for tactical missions, employ combat power, and conduct rear area sustainment operations. Like the BSE, it takes place in a BBS-simulated Mojave desert setting. A training scenario generates an NTC-like operational tempo requiring 24-hour operations and stresses concurrent and parallel planning processes. The exercise allows the unit to practice and receive feedback on key staff procedures, which enable the unit to enter major field training exercises (FTX) at a higher level of proficiency in the staff process. The BBSE generates the information, cues, and simulated operations that allow CSS to be a major consideration.

The BBSE differs from the BSE in several aspects. It presents a faster battle tempo, including a more robust opposing force (OPFOR), concurrent processes, 24-hour operations, and deployed CPs for the brigade and battalion staffs; it incorporates multiechelon staff activities and staff section activities; and the performance objectives are much broader, usually encompassing techniques and procedures for multiple battlefield functions.

Project Objectives	The vision of the project's procedures and outcomes was presented by ARI in terms of two major objectives: <ul style="list-style-type: none"> • To build an implementation support infrastructure at participating unit locations to facilitate the assessment. • To conduct the implementation and assessment at unit locations and Fort Irwin, California (the NTC).
The ISAT Project execution and assessment approach	The project's Execution Plan (HumRRO et al., 1998b) outlined the project's strategy for accomplishing the objectives. It included plans for managing the project from Fort Knox, and providing support to the user units at other locations. Data collection for the assessment would involve interviews, questionnaires, and observations, as outlined in the Assessment Plan (HumRRO et al., 1998a).
Limitations on the assessment	Because only two brigades were going to participate in the implementation and assessment, and because there was no opportunity for rigorous control of the brigade activities, the assessment could not serve as a full evaluation of the products' value, effectiveness, or impact. Instead, ARI and DTDD asked for program monitoring, in the manner of a complete case study of the implementation activities, with intense efforts to obtain reactions and suggestions from all those involved in use of the products.
Implementation Support Plan	<p>As a general approach, the ISAT project's assessment focused on the potential success of the FXXITP products in the hands of the users. The basic strategy was to monitor users while they worked with the training products, and to gather feedback regarding suitability, acceptability, training effectiveness, outcomes, and supportability. Focusing on the <i>impact</i> of the training products rather than on their <i>quality</i> distinguished the ISAT assessment from the established formative evaluation approach used in previous training development research (e.g., C. H. Campbell, Deter, & Quinkert, 1997).</p> <p>Assessing impact, however, demands either an assumption or an assurance of product use. The products were still unfielded, and there was no history of product use by units, other than the formative evaluation trials without further mentoring or assistance. Therefore, ARI directed that the ISAT team assist as necessary to ensure that the products could be used, and monitor all aspects of the attempted implementation.</p>

Anticipated implementation disruptions

A known complication was that the participating brigades would be preparing for a rotation at the NTC. While the impending NTC rotation greatly increased the potential for direct feedback on the effectiveness of the training as implemented, the schedule for such a train-up is intense. As a result, the FXXITP products would likely compete with events from existing unit strategies routinely used to prepare for NTC rotations.

Within the ISAT project, the intent was to work with the units and provide recommendations that would allow the products to complement the units' training strategies. This would leverage use of the training products to better prepare the units to adjust to the faster-paced training environment associated with an NTC rotation. The ISAT approach emphasized a high level of support during preparation and conduct of training exercises to increase the likelihood that units would be able to use, and would use, the products being assessed.

Despite the support from the ISAT team, it was anticipated that use of the products could be affected by outside factors such as operational contingency missions (e.g., Intrinsic Action, Team Spirit), weather-related disasters, and shortfalls of training funds. These conditions could cause the units to alter the way they used the products. The accommodations required by such disruptions would be instructive from a case study and lessons learned perspective, but it was acknowledged that they could also affect the validity of the program assessment.

Unit participation

As the ISAT project began, TRADOC DCST coordinated with the U.S. Forces Command (FORSCOM) to confirm the tasking of units to support the assessment. The TRADOC DCST had directed that the assessment be conducted with two brigades within III Corps. The brigades were to be preparing for their NTC rotations as this would best accommodate the long-term ISAT assessment. One of the two brigades initially selected asked to be replaced, citing their then advanced preparation status for their NTC rotation. Another brigade then agreed to participate upon the condition that they would assist in the assessment of only those products that would meet their peculiar training needs. These products included the BSTS and vignettes, but not the BSE and BBSE.

By May 1998, one of the brigades had begun to use the FXXITP materials. At that time, however, they were ordered to prepare for deployment. Once this occurred, the brigade could no longer support the ISAT effort. In July 1998, yet another brigade volunteered to participate in the assessment. The participating units, then, included two brigades, one of which would not be using the BSE or the BBSE. A limited amount of use had also occurred in the first, deployed, brigade.

Scope of support	Reports on the development of the FXXITP products have indicated that first-time, and even subsequent, implementations of the products have required a fair amount of implementation support from personnel familiar with the products (André et al., 1997; C. H. Campbell et al., 1998; C. H. Campbell et al., 1999; Graves, Campbell, Deter, & Quinkert, 1997; Hoffman, Graves, Koger, Flynn, & Sever, 1995). Although one of this project's critical assessment issues involved investigating the extent to which units could use the products without external support, it was evident that such support would be required to facilitate the assessment. As a result, ARI directed that support be offered and available as needed, especially during unit planning and preparation for product use.
Implementation support teams	The ISAT team established to support product use included training developers and military subject matter experts (SMEs) who had developed the FXXITP. The project located a Training Support Coordinator (TSC) on-site for the units participating in the assessment. The TSC coordinated and directed project activities at the site. He mentored and assisted the units while he oversaw and coordinated the training support for the exercises. He also assisted with the initial orientation training to the corps and division leaders, provided the training for brigade leaders, and directed the training for brigade and battalion training managers. He was directly responsible for carrying out requirements of the assessment plan at that location.
Planning and preparation	During the planning and preparation phase, there was an intense proactive involvement with the participating brigades. That involvement began with a thorough informational program for leaders, training managers, training support personnel and users of the various products. Also during the initial training periods, the ISAT staff briefed the simulation center personnel on the FXXITP products. The simulation center personnel were trained to implement BSTS and monitor vignettes if other units at that location wanted to use them.

Train the trainer sessions	The orientation sessions were followed by train the trainer (T3) sessions, provided to the participating brigades prior to their initial use of the FXXITP products. The T3 in preparation for BSTS included both user orientation and training for unit BSTS administrators. Vignette T3 sessions also had two parts, addressing the unit training coordinators and the unit staff members who would participate as the training audience. The T3 for the BSE and BBSE was modeled after the T3 program incorporated in the BBSE TSP itself. It was preceded by informational sessions for the commanders and brigade staffs and the battle simulation staffs. The three-day T3 session itself was decentralized and focused on the separate groups who would support the exercises, including simulation controllers, the division response cell, the OPFOR controllers, and the training observers.
TSC assistance	Subsequent to the initial training, the ISAT team TSCs continued close coordination with and support of the participating brigades and battalions as they planned for and used the products. They provided advice and assistance to the staffs of the units in selecting and implementing the appropriate option from those available within the products.
Surge team assistance	When one of the participating brigades prepared to conduct a BSE or BBSE, a surge team from the ISAT staff would travel to the brigade location to assist with the event. At that time, they would monitor and assist with training for a wide range of participants (e.g., observers, roleplayers portraying enemy and friendly units, and simulation controllers) and assist with the conduct of the exercise.
Rapid response training development	One additional duty of the ISAT team, not anticipated in the execution plan, involved rapid-response training development. The need arose when one unit asked the ISAT team to provide a modified exercise that would provide benefits similar to those of the BSE but would be implemented using Janus rather than BBS.

Product Utilization	As a general rule, the units implemented the FXXITP training products in progressive fashion. Training began with the BSTS products, then progressed to the vignettes, and (for one brigade) culminated with the BBSE just prior to their NTC rotation. The implementation events and variances from the intended plan are described in Pratt et al. (2000).
Utilization of the Battle Staff Training System	The ISAT team supported and assessed three implementations of the BSTS. Each implementation was different with respect to hardware configuration, T3 comprehensiveness, BSTS system training, and unit member usage. In general, usage was sporadic, and not widely mandated nor encouraged by the chain of command.
Utilization of the Vignettes	One brigade conducted only one vignette, with the assistance of the T3 trainer and in conjunction with their T3 session. The second brigade conducted three vignettes, but made significant modifications to the scenario. The third brigade conducted two vignettes, but did not follow all of the TSP-specified procedures for unit preparation.
Utilization of the Brigade Staff Exercise	None of the brigades implemented the BSE. One brigade worked with the ISAT team to produce a Janus-based counterpart exercise, but a complete TSP was not developed for the exercise. Instead, experienced ISAT team members filled in specific roles to support the implementation.
Utilization of the Brigade and Battalion Staff Exercise	One brigade conducted a BBSE, mid-way between their leader training program (LTP) visit and NTC rotation. Several elements external to the brigade supported the preparation and execution of the BBSE, including the division headquarters and a sister brigade. The installation's simulation center provided BBS support personnel as well as preparation support for the exercise. Members of the ISAT team provided substantive support during train-up, but served only as data collectors during the BBSE itself.
LTP participation and NTC rotation	The ISAT team was able to follow only one brigade to the LTP at Fort Irwin, and to the subsequent NTC rotation; this was the same brigade that had conducted three vignettes, the Janus exercise, and the BBSE.
Summary	As should be obvious, the implementation did not proceed according to plan. The differences between the plan and the reality are important in interpreting the findings. No blame can be attached to any units, but the fact remains that the implementation assessment was compromised by the shortfall.

Assessment Plan	<p>The ISAT project represented an important milestone for ARI's training development efforts. As the first assessment of the FXXITP training products in a routine operating environment, the effort would provide an opportunity to gather valuable data regarding three main areas of interest:</p> <ul style="list-style-type: none"> • Acceptability—Were the training materials doctrinally correct? Were they usable? Were other materials necessary? • Perceptions of Impact—Were the training products useful for learning and practicing job requirements and preparing for other major training events? Did users think that the training had (or would have) a positive effect on performance? • Supportability—What would it take to make the training products useable within a brigade's training plan?
Data collection methods	<p>The ISAT assessment was designed to incorporate a wide range of data collection techniques, including user ratings, written and oral comments, observations, and descriptive documentation. By using multiple methods to address each information need, corroborating or clarifying data would be captured.</p> <p>A principal goal of the assessment was to collect data at every opportunity at which the participating units used the various training products. Throughout the course of the ISAT project, there were six major events that were expected to provide opportunities for data collection:</p> <ul style="list-style-type: none"> • BSTS use • Vignette use • Conduct of the BSE/Janus Exercise • NTC LTP • Conduct of the BBSE • NTC Rotation <p>ISAT team members were to serve as on-site data collectors in both the home station and NTC arenas.</p> <p>An additional occasion for obtaining observations about the FXXITP products came when the ISAT team was invited to brief the four products (BSTS, vignettes, BSE, and BBSE) for personnel from the Seventh Army Training Center (7th ATC). The briefing included information sessions on each product, walkthroughs of the TSPs, and demonstrations of the training exercises. The 7th ATC representatives provided impressions and feedback based on the information and demonstrations.</p>

Assessment Events	As described earlier, there were many departures from the implementation plans within both of the participating brigades. As a result, the data collection was less comprehensive than had been anticipated, and results were not easily interpretable. However, these difficulties had been anticipated and discussed among DTDD, ARI, and ISAT team researchers, and various corrective actions were taken in order to glean the greatest amount of usable information for the three areas of interest.
Data reduction and analysis procedures	In preparation for the data reduction and analysis, a database was constructed that accommodated the majority of the collected data. As the data were collected from the training sites, the ISAT team entered them into the computer database. The ISAT team analyzed the assessment data in two stages: quick-look processing of data as they became available, and comprehensive analysis and interpretation of cumulative data. The goal of this strategy was to identify key findings in a timely manner while reserving systematic conclusions for thorough analysis.
Summary	This section has described the purposes, objectives, and methods of the ISAT project's assessment of the FXXITP products. The assessment, focusing on product impact, was intended to be conducted in a routine operating environment and, thus, relied on the integration of the FXXITP products into unit training plans. The effects of competing demands on unit time, resources, and focus on product implementation were a significant confounding issue.
Lessons Learned	Observation of the attempted implementation revealed a wide range of issues concerning the usability of the FXXITP products. This section discusses those issues from the perspective of lessons learned during the project and recommendations that emerged in discussions with members of the participating units. The lessons are grouped in three areas: acceptability, perceptions of impact, and supportability. A final lesson addresses training effectiveness assessment itself.

Acceptability	<p>During this assessment acceptability was defined as "...the unit's acceptance of the FXXITP products as being doctrinally correct and containing usable materials." Questions that were addressed included: Were the training materials doctrinally correct? Were they usable? Were other materials necessary?</p> <p>The acceptability of the FXXITP products was, for the most part, positive. BSTS users indicated that the BSTS met the basic needs for individual staff level training, although it was not sufficiently interactive. The vignettes were perceived as sufficiently flexible for use in learning centers, in the field, or for "Thursday morning" (staff development) training. The BSTS and BSE were found by 7th ATC reviewers to be the least current of the products. Most felt that the products supported the training they were intended to support. Yet many comments indicated that there were changes that needed to be made to make the products more useful and keep them viable.</p>
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Six lessons addressing acceptability were formulated, as described below.

Lesson A1: Structured training products will inevitably become outdated, and will require continual examination and updating.

It took over five years to develop, implement, and assess the FXXITP products. Because Army doctrine has continued to evolve, some of the products are currently outdated, doctrinally and technologically. Most of the shortcomings of the FXXITP products deal with doctrinal changes to terms and symbols, with some changes to tactics, techniques, and procedures, and newer ways to deliver information. This is an inevitable occurrence for any structured training product, and underlies one of the reasons that the program must have Army-wide support.

Lesson A2: Even though it is inevitable that the products will become outdated, they can be used while updating goes on.

Despite the doctrinal shortcomings of the products, the units were still able to use the products for training. Reviewers of the BSTS from the project, user units, and 7th ATC identified many instances of outdated doctrine; yet users of BSTS were consistently positive regarding the doctrinal currency of the BSTS courses. After their LTP, the one brigade still participating indicated that the training had been useful.

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Lesson A2 (Continued): Even though it is inevitable that the products will become outdated, they can be used while updating goes on.

When asked about the apparent discrepancy, one reviewer said that the fighting units were more likely to overlook doctrinal inconsistencies if the potential training benefit was high. In other words, they cared more about learning to fight well than how they learned how to fight well. When users commented on the BSTS, they were more vocal about the potential benefit the training could offer than the slight discrepancies in doctrine. While doctrinal consistency is critical, it may be that intermittent updates, and not a continuously ongoing revision process, are good enough. The fact is that (as stated in the previous lesson) all structured training products that are tied to doctrine will become outdated as doctrine changes. But the Army, or TRADOC, or the FXXITP, must find a way to distinguish between doctrinal inconsistencies that lead to bad training, and those that are below the noise level. It seems apparent that training units are willing and able to overlook flaws of products if those products are perceived to be good training products.

It seems that, in the short run, the FXXITP products can meet the training needs despite their doctrinal shortcomings. However, units will quickly become tired of training with outdated products and will either quit using them or be required to update the products themselves. In either case, the Army will have lost all of the advantages of standardized and structured training. To ensure that these products remain viable to the unit while remaining standardized and structured, program resources must be allocated to gather feedback on these products, review them for currency, and update them in a timely manner. The force must be kept informed of the updating intentions and progress.

One way to facilitate the maintenance of doctrinal currency would be to use the same products for institutional training. By doing so, the training institutions (which are also responsible for updating doctrine) will by the nature of their institutional training requirements focus on product currency. This also provides an advantage of more widespread understanding of the products, since unit leaders will have used them during their institutional training.

Lesson A3: Future TSPs can be more usable if we incorporate more of the human dimensions of TSP usage.

A consistent finding was that even with TSCs, surge team assistance, and T3 sessions, many participants indicated that they did not use their materials. Unit trainers commented that it was difficult to reproduce, distribute, and explain the contents of the materials. The BSTS data (or rather, the lack of data) indicated clearly the prevalence of problems with training management components that often left unit leaders only partially aware of product options and value, and lacked safeguards to prevent loss of data.

Such findings indicate the products did not fully meet the working needs of the training audience. One likely cause is that developers have not yet identified effective ways to address training constraints with the same expertise that is applied to task-based training needs. Adjusting the design process to bring the human dimensions of TSP usage into closer balance with training objectives and technology considerations could lead to products that make the information easier for the users to access and reduce the burden of getting ready to train.

This may indicate a need to reexamine the entire implementation model. It is easy to say that we must streamline the presentation of materials and minimize the load imposed on the trainers and training audience. At the same time, it is imperative that crucial information (e.g., training objectives, definition of training audience versus support personnel, specific assignments) be disseminated in advance, and that all necessary information and guidance that defines the product structure be available. Failure to provide clear information in advance inevitably leads to confusion about the exercise's purpose, roles and duties, which in turn degrades the event's training value.

Developers of structured training products have expressed frustration with the lack of complete use of TSP materials for years (C. H. Campbell et al., 1998; C. H. Campbell et al., 1999; Graves et al., 1997). Each new development attempts to provide TSPs that are more user-friendly, yet we have not yet cracked the code on user needs. We have simply not been able to comprehend the obstacles and incorporate effective solutions. The answer will not be a simple one. It is likely to be a combination of additional research on what works for time-stressed units, Army and command emphasis on use of the products, and the availability of surge teams or support coordinators. As yet, we have not been able to conduct a controlled study of the effectiveness of different TSP approaches. Such considerations may provide a substantial payoff to both training developers and researchers.

Lesson A4: There needs to be a balance between the time allotted to prepare for these exercises and the time it takes to prepare.

These FXXITP products are not advertised as “turn-key” training, which would convey a design characteristic that is supposed to enable the training coordinators to implement the training products with minimal preparation. Nonetheless, unit training coordinators rarely allocate sufficient time for preparation. Time has proven to be the most valuable commodity to the units participating in this assessment, and is probably equally valuable across AC and RC units. As a general rule, personnel did not study the guides or accomplish preparation activities in accordance with the TSP instructions. It is easy for us to blame the TSPs when in fact it may be that the unit is not providing enough time to prepare for training.

Lesson A5: In addition to doctrinal updates, TRADOC and the FXXITP should continue to incorporate technology updates.

This lesson emerged as the team observed BSTS and BBSE implementation. Units in this assessment used BSTS courseware in stand-alone mode. However, the courses were designed primarily for a local area network (LAN) operating environment. This is not the LAN environment we are used to using today, but a hard-wired Ethernet LAN that was commonplace in 1993. Similarly, the BBSE was originally written for a version of BBS software that was no longer being used at the time of implementation. The ISAT team assisted the simulation center personnel with the updating to allow the exercise to occur. This shows a need to validate assumptions about infrastructure in place when products are ready for fielding. Although a comprehensive systems approach builds infrastructure in parallel with course development, the technology needs to be reexamined continually, just as do doctrinal foundations.

Lesson A6: TRADOC and the FXXITP should continue to develop ways for units to tailor TSP materials to their unit’s organization and equipment, training audience, and Standing Operating Procedure (SOP).

This lesson addresses a range of issues on the advantages of structure and standardization, balanced against the need for programs that are flexible enough for valuable training. Except for the BSTS, TSPs could be provided in an electronic form so that the unit can modify the unit information to match their own. Another option would be to deliver these TSPs using the model of the Commanders’ Integrated Training Tool (CITT [Gossman et al., 1999]). This computer- and Internet-based system, currently under development by ARI and Simulation Training and Instrumentation Command, is designed to help units use existing TSPs as written, modify them for their own situations, or develop new TSPs.

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Lesson A6 (continued): TRADOC and the FXXITP should continue to develop ways for units to tailor TSP materials to their unit's organization and equipment, training audience, and SOP.

The current approach of designing complete structured TSPs to be used by a diverse mix of tactical units leads unit personnel to adopt alter-identities, notional equipment mixes, and so on. The desire to replicate exactly the unit's organization, equipment, signal operations instructions, tactical SOP, and other operational conditions is understandable, but there are no data showing that precise replication increases training value or transfer of training. Research to evaluate this dimension, as well as to find ways to make the products more flexible, would help determine if the Army should invest in unit-specific TSPs.

Units participating in this assessment consistently modified the specified procedures. Abbreviated preparation activities, training audience changes, altered missions, scheduling peculiarities, self-generated performance assessment and after action review (AAR) procedures, and numerous other alterations were common. This highlights the importance of designing TSPs to provide substantial execution flexibility. For example, the vignette TSPs could include instructions for integrating extra participants and outfitting them with relevant training materials.² The design process should take into account the likely variations in utilization, and the evaluation process should incorporate program flexibility as a major dimension of interest.

The single implementation of the BBSE is a case in point. The product was altered significantly to meet the unit's perceived training needs in preparation for an NTC rotation. Yet the BBSE exercise director, the installation deputy commanding general, pointed out that "If we had to generate this exercise on our own, given our organization and other requirements, we would not have done as well."

² The reader should notice at this point the insidious subtlety of "good idea creep." Every such good idea increases the bulk of the TSP, and we have yet to discover how to include the many good ideas without complicating TSP delivery even further.

Perceptions of impact

Impact, in this research, included issues of learning, job performance, and organizational impact. Questions of interest included: Were the training products useful for learning and practicing job requirements and preparing for other major training events? Did users think that the training had (or would have) a positive effect on performance? Most of the responses from users indicated that they saw the potential training value of the products. After the LTP experience, brigade members said that the products had helped them prepare; after the NTC rotation, their comments showed that they were beginning to see some value in the products. Many of the answers to these questions focused less on the existing products than they did on what was still needed—a subtle tribute to the perceived training impact. Only one lesson was derived.

Lesson PII: The existing products need to be expanded.

The call for additional expanded products came mostly on the BSTS and vignettes. On the BSTS, users requested courses for their staff section members as well as for the staff officers. While there are cases where staff officers have used the BSTS courses for their sections, specific courses would provide the information and training that noncommissioned officers (NCOs) need.

On vignettes, users commented that brigade staff vignettes are not enough. The units also need vignettes for battalion staffs, for brigade leadership, for leaders linked from brigade through company and for commanders and their staffs. The so-called “Leader Vignettes” are needed to ensure that all staff section leaders and commanders within the brigade combat team can develop a common understanding of the brigade commander’s intent and information needs. The multi-echelon leader vignettes would help the subordinate commanders understand the amount and type of detail the brigade commander needs to make a decision. These would likely be associated closely with the commander’s critical information requirements and Decision Support Template.

The goal of these vignettes would be to provide a concrete experience (adult learning model start point) from which the participants could discuss the “art” of warfighting. Similarly, the commander-staff vignettes would bring the key leaders of the staff into the process where the staffs add clarity to the information provided by the commanders because they have the time to analyze the information. One user explained that the outcomes of the vignettes for leaders should be staff recommendations for commanders; the vignette should train staff leaders to analyze the right amount of information quickly.

Supportability	<p>Supportability of the products referred to whether a brigade would be able to conduct the FXXITP exercises within the resources available to them. The key question was: What would it take to make the training products useable within a brigade's training plan? In this regard each component of the FXXITP had to be evaluated for supportability based on the requirements established for its use, as laid out in the TSP.</p> <p>The experience on this project would indicate that all of the assessed components of the FXXITP require external support for unit use. The amount of support will vary. For the BSTS, both system installation and initial-use training were provided, and were later supplemented with continuing assistance in recording usage data and keeping the systems running. The support for the vignettes was relatively slight, involving only initial training for the unit personnel. For the more complex elements, the project surge team was in great demand. The Janus exercise was anomalous: the project team prepared the TSP with full expectation of providing a great deal of implementation assistance. But the BBSE, with its relatively comprehensive TSP, also called for surge team efforts.</p> <p>The five lessons stated below address three aspects of supportability.</p>
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Lesson S1: A formal program of education and orientation should be implemented to explain the FXXITP products to the installation and brigade leadership, future leaders, and training institutions.

Throughout the duration of the project, there were questions about the purpose of the FXXITP and its products. Even though initial orientation briefings and product T3 sessions were conducted at both user unit installations, the chain of command at both installations admitted that they never really understood the products as well as they should have. Likewise, the NTC personnel had concerns about the products that showed an incomplete understanding of the product intent, the product purpose(s), and the Army expectations regarding the use and support of the products by the NTC operations group.

In a separate effort, the ISAT team conducted a more comprehensive orientation session with representatives of 7th ATC. Over a 2-day period, the ISAT team provided a hands-on orientation of the BSTS, vignettes, BSE, and BBSE products. This education and orientation effort was felt to be very successful, yet it was not tied to a specific implementation schedule. Rather, the 7th ATC representatives requested the orientation for their own information and evaluation. Perhaps the key to success is in the motivation of the recipients—whether they are participating because they want the information, or because they are feeling pressured to add yet more briefings to an already overburdened schedule.

Lesson S2: A formal program of maintenance should be instituted to ensure that these products remain current and viable.

Maintaining currency has been a continuing challenge for all training products being delivered to the force. The wider lesson applies to products besides those evaluated in this project. All structured training development (which is, by definition, training that is tied to doctrinal task performance) should have a built-in plan for maintenance. As described earlier, maintenance plans for simulation- or computer-based training should also include considerations of updating the projects in synchronization with technological advances.

Lesson S3: A formal program of sustainment and support should be instituted to ensure that units are able to adapt the products as needed and implement them with minimal disruption to unit ongoing requirements.

After concerns about doctrinal currency, the next most frequent request was for products that could be tailored to unit needs and situations. A plan for sustainment of the products could include surge teams that assist first-time users or help with modifications to products to meet unit training needs. Lower cost off-site assistance could be offered by means of a hot line or help desk and a web page for disseminating information. The Internet-based CITT, described earlier, has been augmented with this type of direct-to-user assistance capability

Lesson S4: If Battle Simulation Center (BSC) contractors are expected to support FXXITP product implementation, then their contracted logistics support (CLS) contracts should be written to include that requirement.

Throughout the project, there was a great deal of inconsistency in the level of support available at different simulation centers. One center said that they did not conduct BBS exercises; another center said they were not required to support brigade-level exercises using Janus. This is contrasted to the experience during the development of the BSE/BBSE, where a third center said they could support anything the unit put in front of them.

In order for structured training products to be adequately supported, the simulation center CLS contracts should include language requiring support of the structured training products as they were designed. This could also be expanded to include support requirements for Training Support Brigades (TSB) and Divisions and for the U.S. Army Reserve Exercise Brigades that could provide this training to RC and AC units in the future.

Lesson S5: The program and its products will require Army-wide support in order to be resourced and used.

One of the biggest concerns of the personnel using the products was the level of command support. Without the proper emphasis from the Army chain of command, most participants felt that the products and the training they were intended to support would not be understood, included in training strategies and plans, or resourced.

In order for the FXXITP to be institutionalized, support for the FXXITP must start at the Department of Army (DA) level and must be supported by each major command that will use the products. The TRADOC must not only present the program to personnel attending its schools, but must also be prepared to maintain the program and its products to ensure their continued viability and usefulness to the units in the field. The FORSCOM must support the program by establishing a training strategy that helps units understand how to incorporate these products into their training plans, and must also incorporate requirements for the training into FORSCOM Regulations 350-1 and 350-2 (DA, 1998a, 1998b).

The products cannot simply be added as additional training requirements. They must replace existing but less efficient or effective training. One commander queried "What can I take off my plate in order to do this?" Organizations like the Combat Training Centers (CTCs) must understand the purpose of the FXXITP and its products so they can provide recommendations to units on which FXXITP products they can train with to overcome problems identified during LTP training and CTC rotations.

Thus, despite what was in many cases a good understanding of the products and acceptance that the FXXITP products could help them, not all commanders were able to use these products in lieu of other training events required by FORSCOM and installation training regulations. This seems to have been primarily because the program was a TRADOC initiative and not a DA and FORSCOM supported program.

Training effectiveness assessment

On two important objectives of the project, we were totally unsuccessful. We were unable to see even one complete implementation of any of the products, and we were unable to conduct a rigorous assessment of the effectiveness of the training products. As described earlier, there were a number of reasons: competing unit demands and missions, misunderstandings about product utility, lateness of product introduction into the unit training calendars, lack of understanding of command emphasis. Despite the presence of training coordinators and surge teams, despite the orientation sessions and train the trainer sessions, the program was not implemented.

But even with a complete implementation, we would not have been able to obtain sufficient data to support a full training effectiveness assessment along the line of Kirkpatrick's model (1994). One or two brigades, each with ongoing uncontrolled activities, continuous personnel turnover, and the absence of a control group, would not represent acceptable conditions for such a study. Additionally, many of the data sources were not accessible: NTC observers and LTP personnel protect their clientele and their observations closely, quite properly not permitting any results to be used for purposes for which they are not intended.

This is not to say that the assessment work yielded no useful information. A qualitative assessment, with its detailed description of program implementation, can be the method of necessity in many situations, but is often the method of choice (Patton, 1987). Nonetheless, we feel keenly the need for a description of impact.

Lesson TEA1: We are still in need of a rigorous training effectiveness assessment of the FXXITP products.

Perhaps the Kirkpatrick model (1994) is not the correct one for this kind of training evaluation. Quasi-experimental methods, such as are propounded in D. T. Campbell and Stanley's classic work (1966) and updated in Cook and Campbell (1979), should be explored as more appropriate possibilities for assessment studies. We ought not to abandon the attempt. The guidance in a variety of guides to program evaluation (e.g., Joint Committee on Standards for Educational Evaluation, 1994; King, Morris, & Fitz-Gibbon, 1987; Patton, 1987; Rossi & Freeman, 1993; Shadish, Cook, & Leviton, 1991) should be explored carefully to determine whether there are other approaches that could be incorporated. As we continue to develop structured training products, we should also continue the attempt to obtain evidence of their effectiveness.

Summary

This section has described a number of lessons learned. The lessons address considerations of acceptability, impact, supportability, and training effectiveness assessment itself. The lessons are, on one level, discouraging, as they are generally admissions of shortcomings in the FXXITP products. Within the lessons, however, we have attempted to offer solutions to the identified problems. Some of the solutions are more ambitious than others: Some require additional research, while others will require action at the highest levels of Army leadership. No one solution can solve all of the problems, and no one solution can be truly effective for even one problem without implementation of solutions that address all of the problems.

Those solutions that are within the reach of training designers and developers include research on TSP and implementation models, redesign of TSP products and distribution requirements, and planning for maintenance and sustainment of products. Other solutions, including the need for command emphasis at division-level and higher, and the institutionalizing of the program, will require that TRADOC and Army leaders make a commitment to support the development and implementation of such products that may increase readiness without increasing training costs.

Conclusions and Recommen- dations

This report has summarized a set of 13 lessons, derived from observations, interviews, and analysis of the questionnaire data. The lessons can be further reduced to three critical issues that demand attention, based on this research effort:

- plans for fielding, maintenance, and sustainment;
- methods for making TSPs more usable; and
- Army and TRADOC initiatives for ensuring product use.

Plans for fielding, maintenance, and sustainment

Figure 1 illustrates the relationships among the processes of fielding, maintenance, and sustainment. As shown, initial fielding gradually transitions to ongoing sustainment. Similarly, initial updates are succeeded by a process of continuing updates. Feedback and lessons learned during fielding are used to make the initial updates, which are then delivered and incorporated into the already fielded products. This process continues over time: Units use the products and provide suggestions or concerns, and developers use the information to make continual improvements. Although solutions for each part of the process can be planned and executed separately, all three needs must be addressed in order for any solution to be effective.

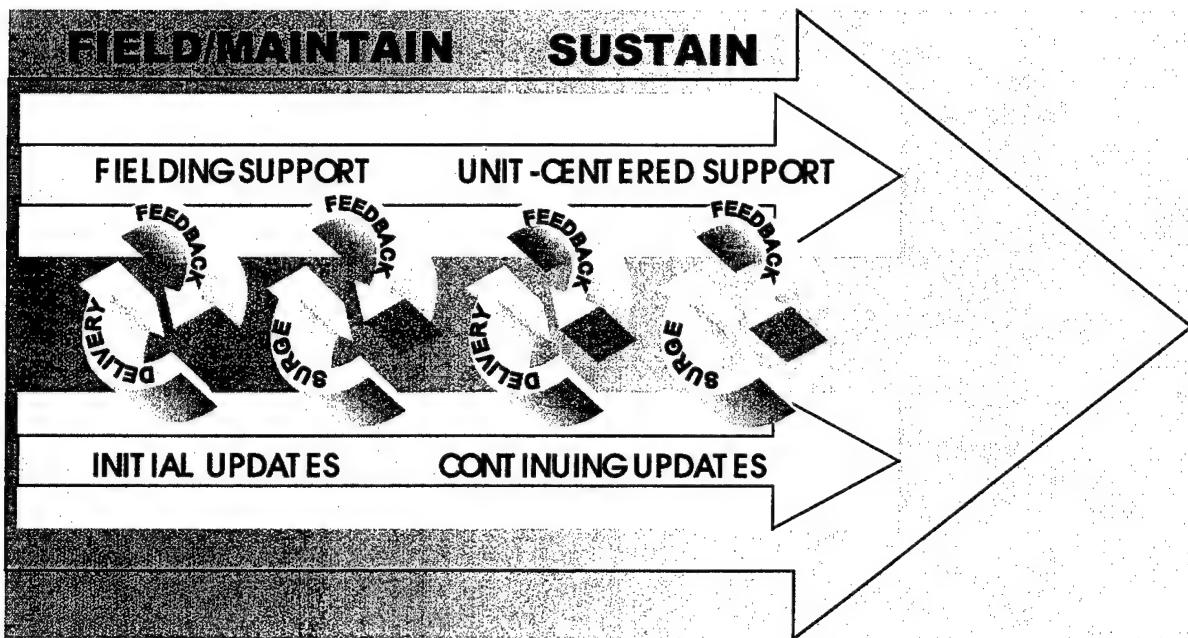


Figure 1. Integration of fielding, maintenance, and sustainment activities for Force XXI Training Program products.

**Plans for fielding,
maintenance, and
sustainment
(continued)**

The plan calls for a combination of hot lines and surge teams to work with first users. The same mechanisms would also be useful for obtaining feedback from units using the materials, for use in planning for and carrying out the most urgently needed updates. As the fielding and implementation support are continuing, the update team would be amassing observation, feedback, and lessons learned concerning the products and their use. This information would be used to determine the needs for additional maintenance of the products.

The requirements demand an integrated, multifaceted plan that addresses initial fielding support, immediate updates, continuing maintenance, and ongoing sustainment for users. The plan must take into consideration primary users in the AC and RC units, as well as institutional users and supporters. Finally, the plan must ensure that the personnel who will carry out the activities are of the appropriate levels of expertise and experience with respect to doctrine, technology, and the training products themselves.

Making training products more usable

The objective is worthy: TSP materials should be extremely user-friendly and should present no barriers to use. For years, training researchers have been working on visions of materials that participants would use as designed. Despite design innovations and increasingly simplified and comprehensive presentations, however, we find repeatedly that guides and instructions are not used. Directed research on what works, for what products, under what conditions, would be useful in addressing this objective. But the FXXITP and the Army should also be prepared to insist that users attempt to use the products. Until we get a full effort at implementation, we are still guessing at optimal formats and models.

Army emphasis on product incorporation in training plans

All we can do with this recommendation is to ask decision-makers to make their decision: Do they want the products to be used? If so, then they must provide the resources—time and personnel—and the edict that tells units that the products are to be used. They must invest in a fielding, maintenance, and sustainment plan that will keep the products viable.

As institutionalized training programs, the LTP, CTC rotations, Battle Command Battle Staff Training for RC units, and other such events “work.” Why is that? These training programs have an established infrastructure that includes expert personnel and well-tested training approaches to ensure support for user units. They are a part of the system: Units know that they must participate, and are eager to do so. The programs’ reputation for effective rotation logistics and tough, thorough training ensure units that their time will be well spent. Since the CTCs and other similar programs began to be a part of the Army training system (in the broadest sense), they have become ingrained in the training culture.

This should be the vision for the FXXITP. It will take time, foresight, and commitment of resources and planning. Insights drawn from this project should be useful in thinking through the infrastructure and education needs. Lessons learned from the earliest days of CTC history would also inform the planning process. Finally, research from organizations such as ARI could continue to guide the institutionalization of the program.

Summary

The ISAT project has provided a wealth of valuable information to the FXXITP and the larger training community. The quantitative data were sparse compared to the richness of the observations and interviews. But in training effectiveness assessments, even when quantitative data are available, the analyses and results must be supplemented with comments and observations. Thus any disappointment with the amount of data is more than relieved by satisfaction with the qualitative information, the honest and constructive input from users, and the insights provided by reviewers. The recommendations and lessons learned should assist the FXXITP, TRADOC, and the Army to continue their attempts to provide training that improves readiness and is accessible by units.

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Appendix A Acronym List

AAR	after action review
AC	active component
AFRU	Armored Forces Research Unit
ARI	U.S. Army Research Institute for the Behavioral and Social Sciences
ATC	Army Training Center
BBS	Brigade/Battalion Battle Simulation
BBSE	Brigade and Battalion Staff Exercise
BSC	Battle Simulation Center
BSE	Brigade Staff Exercise
BSTS	Battle Staff Training System
CBI	computer-based instruction
CITT	Commanders' Integrated Training Tool
CLS	contracted logistics support
COBRAS	Combined Arms Operations at Brigade Level, Realistically Achieved Through Simulation
CP	command post
CS	combat support
CSS	combat service support
CTC	Combat Training Center
DA	Department of the Army
DCST	Deputy Chief of Staff for Training
DTDD	Directorate of Training and Doctrine Development
EMMii	Environment for MultiMedia interactive instruction
FORSCOM	U.S. Forces Command
FTX	field training exercise
XXITP	Force XXI Training Program
HumRRO	Human Resources Research Organization
IFRU	Infantry Forces Research Unit
ISAT	Implementation and Support for the Assessment of Force XXI Training Program
LAN	local area network
LTP	Leader Training Program

NCO	noncommissioned officer
NTC	National Training Center
OPFOR	opposing force
RC	reserve component
SGE	Small Group Exercises
SME	subject matter expert
SOP	standing operating procedure
T3	train the trainer
TMS	training management system
TRADOC	U.S. Army Training and Doctrine Command
TSB	Training Support Brigade
TSC	Training Support Coordinator
TSP	training support package
USAARMC	U.S. Army Armor Center